Intersections: Student Background and Early Literacy Performance

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Background

Beginning with the 2020/21 school year, the Massachusetts Department of Elementary and Secondary Education (DESE) began an ongoing effort to collect and analyze early literacy screening assessment data from schools and districts participating in certain state grants to inform improvement efforts. Grantee schools and districts that provide literacy screening assessment data to DESE select their screening assessments from a list of state-approved, commercially available literacy screener products, and each assessment is typically administered to students three times per year (most commonly in the fall/beginning of year [BOY], winter/middle of year [MOY], and spring/end of year [EOY]).

Outcome data suggest that the current educational system often does not provide adequate support for students from historically marginalized groups, such as those learning English or students with disabilities. Early literacy screening assessments aim to identify students who are not on track to become successful readers and who therefore require additional support. Analysis of the numbers of students identified as significantly below benchmark (using the benchmarks provided within each screening assessment that identify students who need support[1]) shows—as decades of research have shown—that there are differences in student

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1 Most of the approved screening assessments provide several performance benchmarks or risk levels (e.g., "some risk"/"high risk"). For the analyses described in this issue brief, we focus on benchmarks that DESE identifies in its June 2023 Early Literacy Screening Guidance for each approved screening assessment that it recommends that schools and districts use to determine whether students are performing "significantly below relevant benchmarks" as required by state regulation. For example, for DIBELS 8th Edition, DESE recommends using the "At Risk"/"Well Below Benchmark" performance level to identify students whose performance requires schools to take action. For details, see the full report from WestEd, *Early Literacy*

Data Included in 2022/23 Analysis

- *More than 52,000 students in grades K–3*

- *About 20 percent of the state's K–3 student population*

- *Data from 79 districts and 278 schools*

- *Scores from 12 literacy screening assessments: Acadience Reading, aimswebPlus, DIBELS 8th Edition, EarlyBird, FastBridge aReading, FastBridge CBMreading, FastBridge earlyReading, i-Ready Diagnostic, Lexia RAPID, mCLASS, Star Early Literacy, Star Reading*

performance that are associated with students' backgrounds. For example, screening assessment data show that low income students, English learner students, and students receiving special education services were more likely than their peers who are not in those groups to score significantly below benchmark more than once during the school year, which means these students are at significant risk for reading difficulties.[2]

Although prior analysis considers student background characteristics separately, this issue brief examines the multiple overlapping identities that characterize students' backgrounds. In Massachusetts, common intersections of student background include low income status and Black or Hispanic race/ethnicity; low income status and English learner status; English learner status and Hispanic, Black, or Asian race/ethnicity; and low income and English learner status and Hispanic ethnicity. Black and Hispanic students are also more commonly low income and more commonly receiving special education services than White or Asian students are.

To explore how students' intersecting social and economic characteristics relate to risk of reading difficulties, we estimated a multilevel statistical model that examines how these characteristics and school-level factors interact with one another and with the outcome of being classified as significantly below benchmark more than once during the school year. A detailed description of the model can be found in the full report from WestEd, *Early Literacy Performance in Massachusetts: Results of Ongoing Analysis of Literacy Screening Assessments*, by Mariann Lemke, Dan Murphy, Aaron Soo Ping Chow, and Angela Acuña.[3] Model results show that the likelihood of students being identified as needing additional support increases as their association with groups that have been historically undersupported in the general education system increases, but that these increases vary by student groups and school characteristics.

Findings

School characteristics affect students' chances of being identified as at significant risk.

Student-level early literacy performance varies by school characteristics. Prior descriptive analysis of screening assessment data (see *Opportunity Gaps* issue brief) showed that students enrolled in schools with the highest mobility rates, lowest attendance rates, highest discipline rates, fewest experienced teachers, lowest teacher retention rates, and highest percentages of historically marginalized student groups among grantees were more likely to be below benchmark and to stay there from BOY to EOY than were their peers in schools without those characteristics.

Performance in Massachusetts: Results of Ongoing Analysis of Literacy Screening Assessments, by Mariann Lemke, Dan Murphy, Aaron Soo Ping Chow, and Angela Acuña.

2   Note that we use "at significant risk," scoring "significantly below benchmark more than once," and scoring "significantly below benchmark" interchangeably in the sections that follow.

3   The model controls for student- and school-level predictor variables found to be associated with students' likelihood of being significantly below benchmark. Note that multiple models were evaluated before the final model was selected. For example, a variable examining the type of English learner program that students attended was included in the model and found to not be statistically significant, as were variables examining the amount of student mobility, rate of student discipline, and teacher experience within schools. These variables were therefore removed from the final model. Student-level variables retained in the final model include gender, low income status, English learner status, whether the student received special education services, and early childhood (EC) program experience. School-level variables include percentage of low income students, student attendance rate, and teacher retention rate.

Current analysis again demonstrates the relevance of school characteristics to performance and shows how differences in school characteristics affect students. Model results show the likelihood of students being identified as at risk at an *average* school. This means that students in schools with above-average percentages of low income students, below-average teacher retention rates, and below-average student attendance have a *higher* likelihood of being identified as at significant risk. In the screening assessment data, more Black and Hispanic students attend schools with these characteristics than do White or Asian students. For example, although the average percentage of low income students in schools in the early literacy screening assessment data is about 39 percent, Hispanic students attend schools with, on average, 70 percent low income students, meaning the likelihood of being identified as significantly below benchmark is even higher for many Hispanic students than that shown in the following sections, due to the characteristics of the schools they attend.

Conversely, the likelihood of being identified as at significant risk is lower for students who attend schools with below-average percentages of low income students, above-average teacher retention rates, and above-average student attendance.

> **Students who belong to historically underserved student groups are more likely to be identified as at significant risk of reading difficulty, and the more of these groups students belong to, the greater the likelihood.**

Students who receive special education services, are English learners, or come from a low income background are more likely to be identified as at significant risk of reading difficulty than students without those backgrounds, and the chances of being identified as needing support increase as these background characteristics intersect (Figure 1). On average, students have about an 11 percent chance of being identified as significantly below benchmark more than once. That likelihood increases by about 8 percentage points if students come from a low income background, about 17 percentage points if students are English learners, and about 28 percentage points if students receive special education services. The likelihood increases by 30 percentage points for students who both come from a low income background and are English learners and about 42 percentage points for students who both come from a low income background and receive special education services. These students have a 53 percent chance overall of being identified as needing additional support. A small number of students who come from low income backgrounds and receive both special education and English learner services have even higher likelihoods of being identified as at significant risk.

Figure 1. The likelihood of being identified as in need of additional support increases as student background characteristics intersect
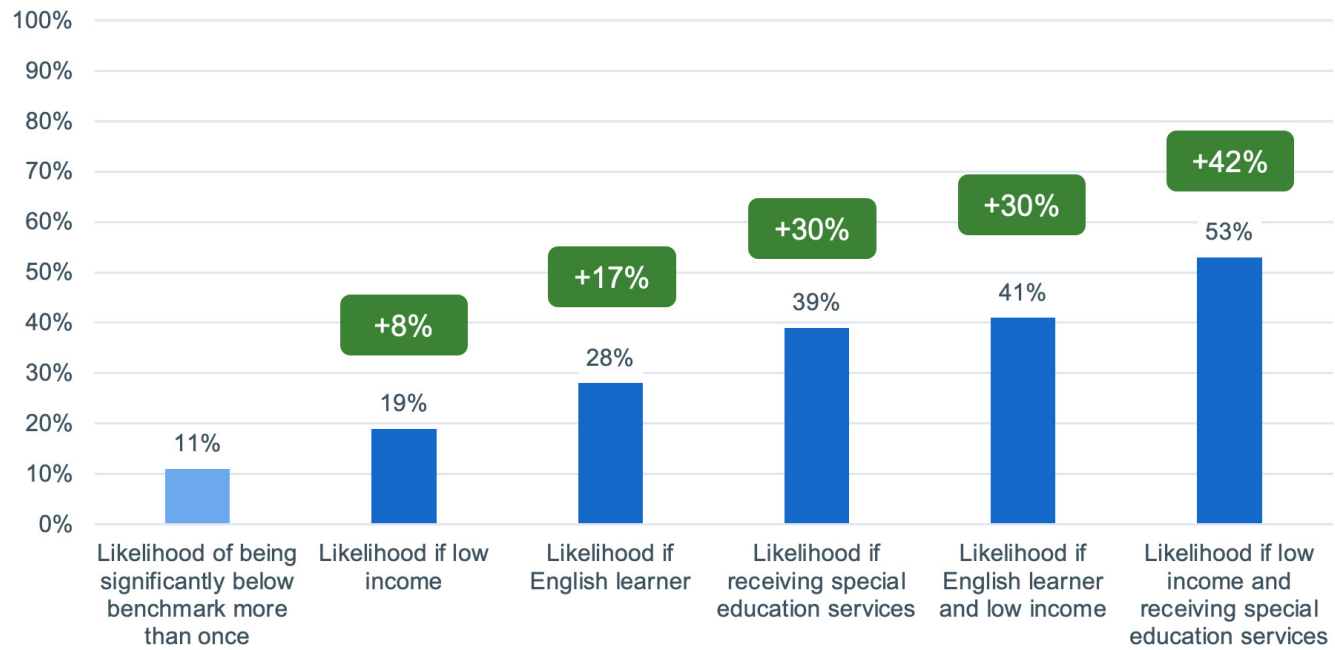
Sources: District-provided screening assessment data and October and June Student Information Management System (SIMS) collection data.

Notes: The likelihood of being significantly below benchmark more than once (11%) is defined by the multiple student and school-level characteristics in the statistical model. See footnote 3 for details. In this analysis, racial/ethnic groups are mutually exclusive.

> **Although the pattern of increasing likelihood of being identified as at significant risk as background characteristics intersect is the same for all students, the increases vary by gender and by other background factors.**

Across all ethnoracial groups, students from a low income background are more likely to need additional support, but the likelihood increases by 5 percentage points for Asian students and 10 percentage points for Hispanic students (Table 1), which is a greater relative change for Asian students, given that, across intersecting categories, Asian students show the lowest likelihoods of being identified as at significant risk.

Additionally, intersecting categories differently affect males and females, with females generally having greater likelihood of being identified as at risk. Across ethnoracial groups, female English learners are 3 or 4 percentage points more likely to be identified as at significant risk than males. For example, Hispanic English learners who are female have a 47 percent chance of being identified as significantly below benchmark more than once, compared to 43 percent for Hispanic English learners who are male.

Similarly, across ethnoracial groups, female students who receive special education services are more likely than male students to be identified as at significant risk. When background characteristics are examined together, female students who receive special education services and who come from low income backgrounds have the highest likelihoods of being identified as at significant risk. Black females who receive

special education services and who come from a low income background have a 70 percent chance of being identified as requiring additional support to be successful readers—the highest among students included in this analysis—suggesting that this group is particularly underserved by the current system. Interestingly, however, there is a 9 percentage point difference between low income Black males and females receiving special education services in the probability of being identified as at significant risk, but a greater difference between Asian males and females (16 percentage points; low income Asian females receiving special education services have a 47 percent chance of being identified as at risk, compared to 31 percent for males).

Table 1. Increased likelihood of needing additional support for English learner students and students receiving special education services who also come from low income backgrounds varies by gender and race/ethnicity

Race/Ethnicity	Asian		White		Black		Hispanic	
Gender	Females	Males	Females	Males	Females	Males	Females	Males
Likelihood of being significantly below benchmark more than once	7%	7%	14%	14%	16%	16%	18%	18%
Likelihood if low income	12%	12%	22%	22%	25%	25%	28%	28%
Likelihood if EL	24%	21%	40%	36%	44%	40%	47%	43%
Likelihood if receiving special education services	40%	26%	56%	46%	57%	48%	56%	44%
Likelihood if EL and low income	35%	31%	53%	49%	58%	54%	61%	57%
Likelihood if low income and receiving special education services	54%	38%	68%	60%	70%	61%	68%	58%

Source: District-provided screening assessment data.
Note: EL = English learner.

> **Early childhood (EC) experience and, more specifically, formal EC experience, is associated with reduced likelihood of being identified as significantly below benchmark for students in kindergarten and beyond, particularly for English learner students.**

Student experiences even before kindergarten also relate to their performance in ways that intersect with other factors. Early childhood (EC) experience has long been shown to have positive effects on later outcomes for students. More than three quarters of kindergarten students with data on EC experience participated in either formal or informal EC programs, with the vast majority participating in formal EC

programs.[4] Low income and English learner students participated less often in EC programs, compared to students who are not in those groups. Students receiving special education services were more likely to participate in EC programs than students who were not receiving these services, perhaps due to early intervention programs. Hispanic, American Indian/Alaska Native, and Native Hawaiian/Pacific Islander students were less likely to participate in any EC program than were White, Black, and Asian students.

The 2022/23 analysis found formal EC experience to be a statistically significant predictor not only for kindergarten students but for all students in grades K–3. This finding suggests that the relationship between formal EC experience and student literacy performance may persist over time.

Across gender and ethnoracial groups, students who attended formal EC programs were less likely to be identified as significantly below benchmark multiple times during the school year. Results also show that, across ethnoracial groups, formal EC experience decreases the chances of low income students and English learner students being identified as significantly below benchmark multiple times.

Effects of formal EC experience were most pronounced for English learner students, and for Black English learner students in particular (see Figure 2). Note that Figure 2 shows results for females only—male students show the same patterns of reduced risk, but the likelihood of female English learner students being significantly below benchmark more than once is always greater than for male English learner students. The likelihood of Black English learner students being identified as significantly at risk is reduced by about 20 percentage points when they have attended formal EC programs (24 percent, compared to 44 percent, for females; 21 percent, compared to 40 percent, for males). Hispanic, Asian, and White English learner students who attended formal EC programs were also less likely to be identified as significantly below benchmark. Across ethnoracial groups, low income students who attended formal EC programs had about a 1 or 2 percentage point decrease in likelihood of being identified as at significant risk.

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4   A *formal EC program* is a public school preschool, licensed community-based preschool/child care, Head Start program, and/ or licensed family child care provider. *Licensed family child care* refers to state-licensed child care in a group setting in a home. It may include care in the home of a family member if the provider is both a relative and a licensed child care provider providing care to children from multiple families. *Center-based care* refers to care for children in a group setting, including public and private preschools, Head Start, early education and care centers, and inclusive/integrated public preschools. Informal EC experiences include Coordinated Family and Community Engagement (CFCE) services and Parent Child Home Program (PCHP) participation. CFCE services are locally based programs serving families with children from birth through school age (e.g., parent–child playgroups, parent–child activities). PCHP is funded through the Massachusetts Department of Early Education and Care. Not every community has a program. PCHP is a home-visit model providing low income families with the knowledge, skills, and tools to build school readiness in their homes before their children enter school.

Figure 2. Formal EC experience reduces the probability of risk most for English learner students, and particularly for Black English learner students
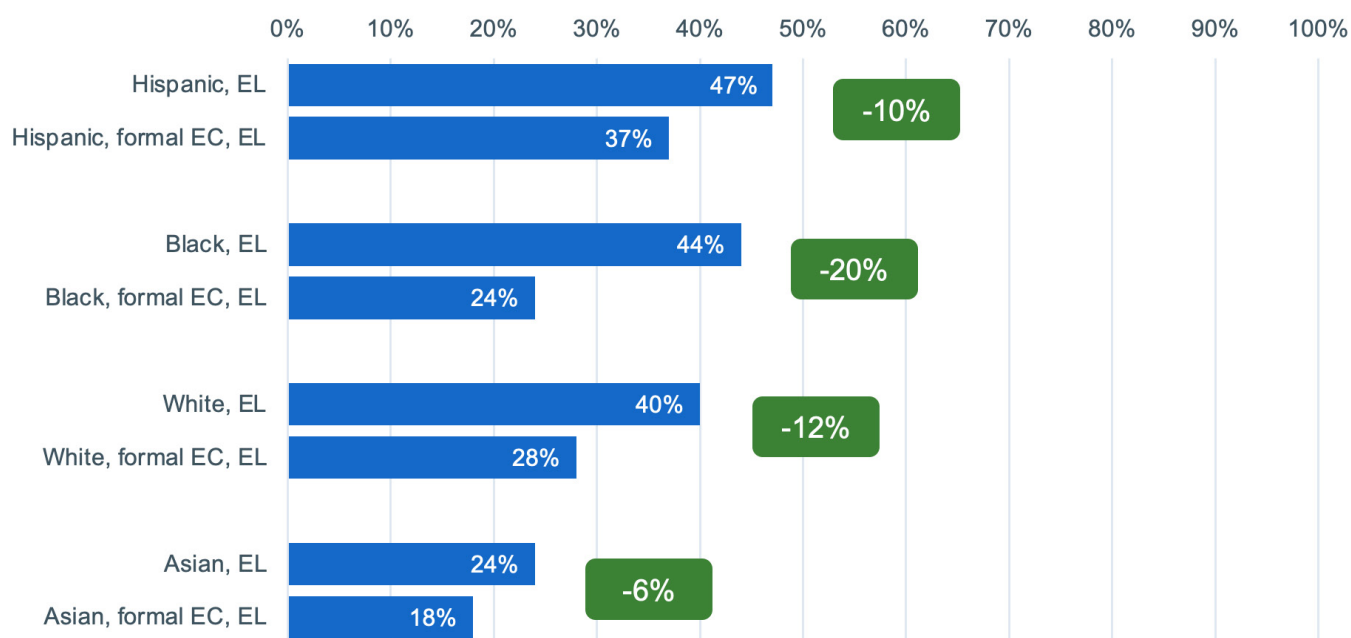
Sources: District-provided screening assessment data and October and June SIMS collection data.

Notes: In this figure, racial/ethnic groups are mutually exclusive; that is, students can only be identified as belonging to a single group. This restriction was for the purposes of the statistical model. This figure shows results for females only. EL = English learner.

Implications for Policy and Practice

Increasingly, researchers have begun to analyze the combined effects of social categories, rather than focusing on disaggregation to single categories. These types of analyses, although they increase the complexity of reporting, can highlight the variety of ways in which overlapping identities affect outcomes. As shown in this issue brief, although the likelihood of being identified as at significant risk for reading difficulties increases in somewhat predictable ways (e.g., low income students are more likely at risk than non–low income students; low income English learner students are more likely at risk than low income non–English learners), there are also some notable differences within and across student groups. For example, even among low income English learners, Hispanic females have a greater chance of being identified as at significant risk than female students from other racial/ethnic groups or than Hispanic males. Among students receiving special education services, Black students, and particularly Black female students, are most likely to be at significant risk of reading difficulty. Finally, EC experience appears to be particularly helpful in reducing the likelihood of reading risk for English learner students. Although this analysis cannot identify the causes for these findings and others described in this issue brief, they do suggest some potential implications for policy and practice:

- **Educators and policymakers may need to examine literacy screening data carefully for differences that are not apparent from simple disaggregation.** Such analysis may include monitoring how well different types of support or interventions work for different students. Screening assessment

publishers may be able to provide additional reporting options for literacy screening assessments to support such analysis.

- **Considering student characteristics and school characteristics in combination may be a useful strategy when targeting resources and interventions, such as EC programming.** Taking school contexts and student identities into account in determining how best to support students could help reduce the likelihood of students being identified as at risk. Additional research may also be needed to determine how and why student and school factors interact and which types of supports are most effective in addressing disparities.

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